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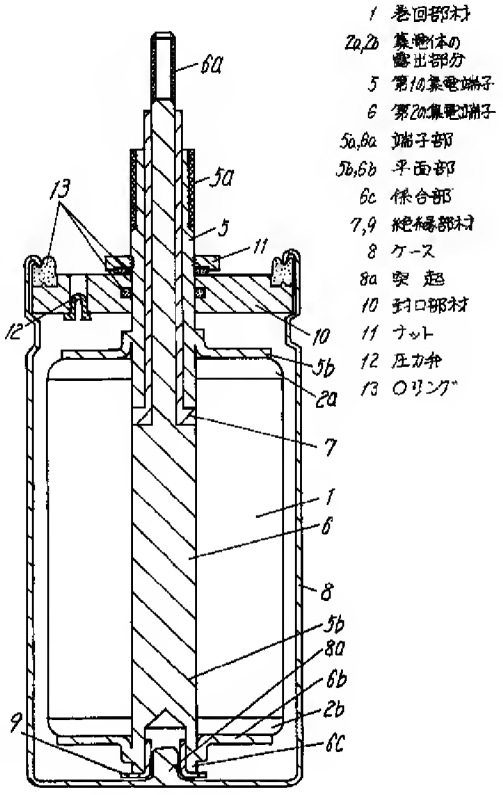
要約

(57)【要約】
【課題】コンデンサの内部抵抗を減少させることができ、かつ陰極、陽極端子の両方を同一方向に取り出す場合でも容易に生産が可能なコンデンサを提供することを目的とする。
【解決手段】平板状の一対の電極の端面が互いに逆方向に突出するようにして一対の電極の間にセパレータを介在させ、これらを巻回することにより構成された巻回部材1と、この巻回部材1に含浸される電解液と、巻回部材1を収納するケース8と、このケース8の開口部を封口する封口部材10とを備え、上記巻回部材1において逆方向に突出する電極の端面に同方向から一対の電極が引き出されるように構成さ

れた金属製の集電端子5，6を接合した構成とすることにより、内部抵抗を減少させることができる。



請求の範囲

【特許請求の範囲】
【請求項1】平板状の一対の電極をその間にセパレータを介在させてかつ夫々の電極の端面が互いに逆方向に突出するようにして巻回することにより構成された中空状の巻回部材と、外部接続用の端子部を備えてつば状に形成された平面部が上記巻回部材の一方の端面に接合された中空状の第1の集電端子と、上記巻回部材の中心部ならびに第1の集電端子の中心部を挿通して第1の集電端子に設けられた外部接続用の端子部と同一方向に引き出される外部接続用の端子部を備えてつば状に形成された平面部が巻回部材の他方の面に接合された第2の集電端子と、上記巻回部材を駆動用電解液と共に収納する有底筒状のケースと、上記第1の集電端子ならびに第2の集電端子に設けた外部接続用の端子部が挿通する貫通穴を設けて上記ケースの開口部を封止した封口部材からなるコンデンサ。
【請求項2】平板状の一対の電極として、金属箔もしくは導電性高分子からなる集電体上に集電体の一端に集電体の露出部分が形成されるように活性炭と結着剤と導電剤の混合物からなる分極性電極層を形成してなる電極を用いた請求項1に記載のコンデンサ。
【請求項3】平板状の一対の電極として、表面に金属酸化皮膜を設けた金属箔からなる電極箔を用いた請求項1に記載のコンデンサ。
【請求項4】平板状の一対の電極の間に介在させるセパレータとこのセパレータに含浸する電解液に代え、機能性高分子分子もしくはセパレータと機能性高分子からなる複合部材を設けた請求項1に記載のコンデンサ。
【請求項5】第1の集電端子ならびに第2の集電端子の巻回部材の端面に接合されるつば状の平面部分を夫々独立した部品として構成し、この独立した部品と第1の集電端子ならびに第2の集電端子の残部を夫々接合するようにした請求項1に記載のコンデンサ。
【請求項6】外部接続用の端子部を有し、かつ巻回部材の端面に接合されるつば状の平面部分を夫々独立した部品として構成した第1の集電端子の封口部材と接する部分に封口部材の一部を一体成形した請求項5に記載のコンデンサ。

【請求項7】集電端子の巻回部材の端面に接合されるつば状の平面部分または集電端子から分離されて独立した部品の同平面部分にスリット状もしくは穴状等の欠落部分を設けた請求項1～6のいずれか一つに記載のコンデンサ。
【請求項8】集電端子の巻回部材の端面に接合されるつば状の平面部分または集電端子から分離されて独立した部品の同平面部分に波状もしくは隆起状の凹凸部を設けた請求項1～6のいずれか一つに記載のコンデンサ。
【請求項9】ケースを有底の角筒状にした請求項1に記載のコンデンサ。
【請求項10】ケース、封口部材、ナットを金属もしくは高分子材料により構成した請求項1に記載のコンデンサ。
【請求項11】ケースに代え、巻回部材を外装樹脂でモールドするようにした請求項1に記載のコンデンサ。
【請求項12】ケースの内底面に巻回部材固定用の突起を設けた請求項1または9に記載のコンデンサ。
【請求項13】第2の集電端子の巻回部材に接合される平面部と反対方向の平面部分に巻回部材固定用の突起を設けた請求項1または5に記載のコンデンサ。
【請求項14】集電端子の巻回部材と接合される平面部にレーザー光の吸収を高めるための処理を行った請求項1または請求項5に記載のコンデンサ。
【請求項15】集電端子と巻回部材の接合が、金属溶射、溶接、ろう接、導電性接着剤を用いた接着の少なくとも一つを用いて行われたものである請求項1に記載のコンデンサ。

詳細な説明

【発明の詳細な説明】
【0001】
【発明の属する技術分野】本発明は各種電子機器に使用されるコンデンサに関するものである。
【0002】
【従来の技術】従来のこの種のコンデンサについて図面を用いて説明する。
【0003】図10は従来のコンデンサの構成を示す断面図、図11は同コンデンサに使用される巻回部材の構成を示す展開斜視図である。
【0004】図11において、26aと26bは平板状の一対の電極、27a～27dは上記平板状の一対の電極26a，26bに接続されたリード板、28はセパレータであり、このようにリード板27a～27dが接続された平板状の一対の電極26a，26bをその間にセパレータ28を介在させた状態で巻回することにより、巻回部材29が構成されている。
【0005】また、図10において、29は上記リード板27a～27dが接続された巻回部材、30はこの巻回部材29が収納された有底筒状のケース、31はこのケース29の内底面に配設された巻回部材固定用部材、32は上記ケース30の開口部を封止する端子板、33はこの端子板32に装着され上記リード板27a～27dと接続される外部接続用の端子、34は上記端子板32に装着された圧力弁、35はOリングであり、従来のコンデンサはこのように構成されたものであった。
【0006】
【発明が解決しようとする課題】しかしながら上記従来の構成のコンデンサでは、コンデンサの低抵抗化に関する市場要求が近年さらに高まっている状況の中で、コンデンサの内部抵抗を下げようとした場合、リード板27の枚数を増す方法、リード板27a～27dの接続位置を最適化する方法等がある。ここで前者におけるリード板27の枚数を増す方法においては、(数1)に従ってリード板27の枚数を増加させるに従い巻回部材29を構成する一対の電極26a，26bの抵抗は低減できるが、上記リード板27を外部接続用の端子33に接続する場合は、端子33のリード板27の接続部に複数枚のリード板27を積層して接続しなければならないため、端子33のリード板接続部に接続できるリード板27の接続枚数はケース30内の寸法、接続作業性、信頼性等の問題から限界があり、リード板27の枚数はむやみに増加させられないという課題があった。
【0007】また、後者のリード板27a～27dの接続位置を最適化する方法においては、例えば、複数枚接続されたリード板27a～27dの距離を同じにし、かつ電極26a，26b端部とこの電極26a，26bの端部に最も近いリード板27aとの距離を複数枚接続されたリード板27a～27dの距離の1／2にした場合は、巻

回部材29を構成する一対の電極26a，26bの抵抗値は理想的なものとなるが、それらを実際に巻回した場合においては、一対の電極26a，26bのそれぞれから引き出された複数枚のリード板27a～27dは中心から外側にいくにしたがってリード板27a～27dの位置がずれるものであった。したがって、後者の方法においては、一対の電極26a，26bの抵抗値は理想的なものより増大するという課題を有したものであった。

【0008】また、本発明者が、特願平09－322596号にて提案した構成のコンデンサにおいて、有底筒状のケースを使用し、陰極、陽極端子の両方を同一方向に取り出す構成の場合には、内部構造が複雑になり、量産が困難であるという課題があった。

【0009】本発明はこのような従来の課題を解決し、内部抵抗を減少させることができ、かつ陰極、陽極端子の両方を同一方向に取り出す場合でも容易に生産が可能なコンデンサを提供することを目的とするものである。

【0010】

【課題を解決するための手段】上記課題を解決するために本発明は、平板状の一対の電極をその間にセパレータを介在させ、かつ夫々の電極の端面が互いに逆方向に突出するようにして巻回することにより構成された中空状の巻回部材と、外部接続用の端子部を備えてつば状に形成された平面部が上記巻回部材の一方の端面に接合された中空状の第1の集電端子と、上記巻回部材の中心部ならびに第1の集電端子の中心部を挿通して第1の集電端子に設けられた外部接続用の端子部と同一方向に引き出される外部接続用の端子部を備えてつば状に形成された平面部が巻回部材の他方の面に接合された第2の集電端子と、上記巻回部材を駆動用電解液と共に収納する有底筒状のケースと、上記第1の集電端子ならびに第2の集電端子に設けた外部接続用の端子部が挿通する貫通穴を設けて上記ケースの開口部を封止した封口部材からなる構成としたものである。

【0011】この本発明により、コンデンサにおける一対の電極の体積抵抗を減少させることができ、かつ陰極、陽極端子の両方を同一方向に取り出す場合でも容易に生産が可能となる。

【0012】

【発明の実施の形態】本発明の請求項1に記載の発明は、平板状の一対の電極をその間にセパレータを介在させ、かつ夫々の電極の端面が互いに逆方向に突出するようにして巻回することにより構成された中空状の巻回部材と、外部接続用の端子部を備えてつば状に形成された平面部が上記巻回部材の一方の端面に接合された中空状の第1の集電端子と、上記巻回部材の中心部ならびに第1の集電端子の中心部を挿通して第1の集電端子に設けられた外部接続用の端子部と同一方向に引き出される外部接続用の端子部を備えてつば状に形成された平面部が巻回部材の他方の面に接合された第2の集電端子と、上記巻回部材を駆動用電解液と共に収納する有底筒状のケースと、上記第1の集電端子ならびに第2の集電端子に設けた外部接続用の端子部が挿通する貫通穴を設けて上記ケースの開口部を封止した封口部材からなる構成としたものであり、この構成により巻回部材の電極の端面に金属からなる集電端子を接合しているため、この集電端子は従来のリード板と外部端子の役目を成し、かつこの集電端子は巻回部材の端面に配置されているため、一対の電極の体積抵抗を減少させることができるという作用を有する。さらに、コンデンサの一方の端面に陽極と陰極の両端子を容易に引き出すことができるという作用を有する。

【0013】請求項2に記載の発明は、請求項1に記載の発明において、平板状の一対の電極として、金属箔もしくは導電性高分子からなる集電体上に集電体の一端に集電体の露出部分が形成されるように活性炭と結着剤と導電剤の混合物からなる分極性電極層を形成してなる電極を用いた構成としたものであり、この構成によれば、分極性電極層の界面で形成される電気二重層を利用した電気二重層コンデンサとして使用できるものであり、大容量でかつ低抵抗が必要とされるモータ駆動用の二次電源としての利用が可能となり、電気二重層コンデンサの内部抵抗の減少により大電流で充電もしくは放電しても、充放電における電圧の急激なダウン部分あるいはアップ部分の電圧範囲を小さくすることができるため、コンデンサのより大電流での充放電ができるという作用を有する。

【0014】請求項3に記載の発明は、請求項1に記載の発明において、平板状の一対の電極として、表面に金属酸化皮膜を設けた金属箔からなる電極箔を用いた構成としたものであり、この構成によれば、例えば電極の金属材料をアルミニウムとした場合アルミ電解コンデンサとして使用できるものであり、主に高リプル電流化が必要なインバータ回路用のアルミ電解コンデンサとしての利用が可能となり、アルミ電解コンデンサの内部抵抗の減少により大電流を印加する場合の製品発熱を低減することができるため、従来のアルミ電解コンデンサより高リプル電流化が可能になるという作用を有する。

【0015】請求項4に記載の発明は、請求項1に記載の発明において、平板状の一対の電極の間に介在させるセパレータとこのセパレータに含浸する電解液に代え、機能性高分子分子もしくはセパレータと機能性高分子からなる複合部材を用いた構成としたものであり、この構成によれば、機能性高分子コンデンサとして使用できるものであり、従来の巻回タイプの機能性高分子コンデンサより低インピーダンスのコンデンサを提供でき、駆動用電解液を使用しないためにドライアップが要因の寿命劣化モードがなく、コンデンサの長寿命化を図ることができるという作用を有する。

【0016】請求項5に記載の発明は、請求項1に記載の発明において、第1の集電端子ならびに第2の集電端子の巻回部材の端面に接合されるつば状の平面部分を夫々独立した部品として構成し、この独立した部品と第1の集電端子ならびに第2の集電端子の残部を夫々接合するようにした構成のもので、この構成によれば、筒形のコンデンサの一方の端面に陽極と陰極の両端子を容易に引き出すことができ、その結果、封止の絞り位置、絞り込み寸法等の従来の製品設計寸法や封口部材寸法、ケース寸法などの製品の各部材寸法も大幅な変更をすることなく容易に製品化できるもので、さらに外部接続用の端子部を有した集電端子の残部を巻回部材の巻芯とすることにより、芯材のない場合と比較して堅く巻くことができるために巻きずれの軽減ができ、かつ電極間の距離を短くすることができるのでコンデンサの内部抵抗を減少させることができるという作用を有する。

【0017】請求項6に記載の発明は、請求項5に記載の発明において、外部接続用の端子部を有し、かつ巻回部材の端面に接合されるつば状の平面部分を独立した部品として構成した第1の集電端子の封口部材と接する部分に封口部材の一部を一体成形した構成のもので、この構成によれば、第1の集電端子の残部に一体成形された封口部材の一部と封口部材を接合することにより封口が可能であり、コンデンサの封口に必要な部品点数が削減できるという作用を有する。

【0018】請求項7に記載の発明は、請求項1～6のいずれか一つに記載の発明において、集電端子の巻回部材の端面に接合されるつば状の平面部分または集電端子から分離されて独立した部品の同平面部分にスリット状もしくは穴状等の欠落部分を設けた構成としたもので、この構成によれば、例えば金属溶射の方法で巻回部材に対して集電端子を接合する場合、その方法として巻回部材に集電端子を押し当て、集電端子側から所定の部分に溶融された金属粉体状のものを噴射し、集電端子の平面部分の欠落部分の端面とこの端面に当接している巻回部材の集電体の露出部分が溶射金属を媒体として接合するものであるため、金属溶射の方法で巻回部材に対して集電端子を接合する場合には集電端子の平面部分の欠落部分が必要不可欠であり、また、その他の接合方法の場合においては、次の工程である巻回部材への電解液の含浸の際、上記集電端子の平面部分の欠落部分は、電解液が巻回部材へ浸入する一つの浸入経路となるものであるという作用を有する。

【0019】請求項8に記載の発明は、請求項1～6のいずれか一つに記載の発明において、集電端子の巻回部材の端面に接合されるつば状の平面部分または集電端子から分離されて独立した部品の同平面部分に波状もしくは隆起状の凹凸部を設けた構成としたもので、この構成によれば、巻回部材に対して集電端子を接合した後の次の工程である巻回部材への電解液の含浸の際、上記集電端子の波状もしくは隆起状の凹凸部は電解液が巻回部材へ浸入する一つの浸入経路となるという作用を有する。

【0020】請求項9に記載の発明は、請求項1に記載の発明において、ケースを有底の角筒状にしたもので、この構成によれば、例えばコンデンサを直列的に密に配置したバンクとして使用する際、数十A以上のレベルの電流でコンデンサのバンクに対して繰り返し充放電を行うとコンデンサの内部で発熱が生じるが、ケースが筒状の場合、コンデンサのケース側面どうしの接触面積が角状の場合と比較して少ないため、外部への放熱を容易にすることができ、一方、ケースが角状の場合、筒状である場合と比較して内部の空隙が大きくなり、例えばコンデンサに対する過電圧により電解液が分解して急激なガス発生が生じた際もケースの内部の圧力上昇が緩和できるため、封口板に配接された圧力弁の作動時間を遅らせることができるものである。また、ケースを有底もしくは両端を開口したものを使用した場合においては、コンデンサの一方の端面に陽極と陰極の両端子を配設した構造、もしくはコンデンサの一方の端面に陽極の端子を配設し、かつ他方の端面に陰極の端子を配設した構造のコンデンサを得ることができるものであり、これにより、コンデンサと電気回路の接続状況に応じ対応することができるものであるという作用を有する。

【0021】請求項10に記載の発明は、請求項1に記載の発明において、ケース、封口部材、ナットを金属もしくは高分子材料により構成したもので、この構成によれば、金属からなるケースを使用する場合、現行の封口部材として一般に用いられているケースの絞り工法による封口が可能であり、封口方法においては大幅な変更を必要としないものであり、また封口部材が金属部材である場合、集電端子の端子部分と上

記金属からなる封口部材の接面において絶縁処理もしくは絶縁部材の挿入等により絶縁が必要であるが、上記金属からなる封口部材と金属からなるケースのアーク溶接等の接合が可能であり、この構成によれば充放電等によりコンデンサの内部に発生した熱を熱伝導性のよい金属を封口部材に使用することにより外部への放熱を容易にし、またOリング等の部品点数が削減できるものである。また、高分子からなるケースを使用した場合もケースの絞り工法による封口が可能であり、また封口部材が高分子部材である場合、上記高分子からなる封口部材と高分子からなるケースの超音波溶接等の接合が可能であり、Oリング等の部品点数が削減できるものである。また、ナットは通常金属からなるナットを使用するものであるが、高分子からなるナットを使用し、かつ高分子からなる封口部材を使用する場合、ナットと封口部材を超音波溶接等で接合することができ、Oリング等の部品点数が削減できるものであるという作用を有する。

【0022】請求項11に記載の発明は、請求項1に記載の発明において、ケースに代え、巻回部材を外装樹脂でモールドするようにしたもので、この構成によれば、従来のようなケースの絞り加工による封止が必要でなく、巻回部材の樹脂モールドと同時に封口が可能であるため、従来と比較して生産工程数が削減でき、かつ従来必要とされていた封口工程における製品切り替え時の封口寸法の設定などの作業が削減でき、生産性の向上を図ることができるという作用を有する。

【0023】請求項12に記載の発明は、請求項1または9に記載の発明において、ケースの内底面に巻回部材固定用の突起を設けたもので、この構成によれば、有底ケースの内面の底の部分とそれに接する集電端子の固定ができ、コンデンサに対して外部より振動が加えられた際においても封口部材側に取り付けられた集電端子に対してのストレスが軽減できるため、製品の耐震性を向上させることができ、かつコンデンサ使用時に内部発熱が生じた場合においても外部への放熱性を向上させることができるという作用を有する。

【0024】請求項13に記載の発明は、請求項1または5に記載の発明において、第2の集電端子の巻回部材に接合される平面部と反対方向の平面部分に巻回部材固定用の突起を設けたもので、この構成によれば、有底ケース内面の底の部分とそれに接する集電端子の固定ができ、コンデンサに対して外部より振動が加えられた際においても封口部材側に取り付けられた集電端子に対してのストレスが軽減できるため、製品の耐震性を向上させることができ、かつコンデンサ使用時に内部発熱が生じた場合においても外部への放熱性を向上させることができるという作用を有する。

【0025】請求項14に記載の発明は、請求項1または5に記載の発明において、集電端子の巻回部材と接合される平面部にレーザー光の吸収を高めるための処理を行ったもので、この構成により、例えば集電端子の巻回部材と接する平板部分において巻回部材の端面と接している面と反対方向の面にレーザー光の吸収を高めるための処理、例えば電気化学的なエッチング処理、もしくは金属酸化物の蒸着処理、もしくはブラスト処理等を行った後、その処理を行った側の面にレーザー光を照射してコンデンサ素子の端面と溶接した場合、処理をしない場合と比較してレーザー光の吸収がよいために低エネルギーで溶接が可能であり、レーザー光の照射の間隔を短くすることができて生産性を向上させることができるという作用を有する。

【0026】請求項15に記載の発明は、請求項1に記載の発明において、集電端子と巻回部材の接合が、金属溶射、溶接、ろう接、導電性接着剤を用いた接着の少なくとも一つを用いて行われたものである構成としたもので、この構成により、金属溶射の場合、その方法として巻回部材に集電端子を押し当て、集電端子側から所定の部分に溶融された金属粉体状のものを噴射するもので、この方法によれば巻回部材の巻きずれが生じている際においても強固な接合が簡単な操作により行えるため、スムーズな生産が可能となるものである。また、溶接の場合、その方法として巻回部材に集電端子を押し当て、例えば集電端子側から所定の部分にレーザーを当ててその部分を接合するもので、この方法によれば接合部分のコントロールが容易で、集電端子接合後の巻回部材に対して電解液の含浸を行う際、集電端子接合後の巻回部材の周囲にある電解液が容易に巻回部材の内部へ浸入することができ、次の工程である電解液の含浸を短時間で行うことができるものである。また、ろう接、導電性接着剤を用いた接着の場合、集電端子と巻回部材の間に接合部材を配して接続する工法で、上記溶接の場合と同様に接合部分のコントロールが容易で、集電端子接合後の巻回部材に対して電解液の含浸を行う際、集電端子接合後の巻回部材の周囲にある電解液が容易に巻回部材の内部へ浸入することができ、次の工程である電解液の含浸を短時間で行うことができるものである。さらに併用する場合の例として、例えば金属溶射接合は金属粉体状のものを噴射し接合を行うもので、接合部分にポーラスな部分が存在するが、そこに導電性材料を充填し固化した場合、電極と集電端子の接続抵抗をさらに減少させることができ、これによりコンデンサの内部抵抗もさ

らに減少させることができるという作用を有する。
【0027】以下、本発明の実施の形態について図面を用いて説明する。
【0028】(実施の形態1)図1は本発明の第1の実施の形態によるコンデンサの構成を示す断面図、図2は同コンデンサに使用される巻回部材の展開斜視図、図3は同巻回部材に集電端子を接合した状態の斜視図である。図1において、1は巻回部材、5はこの巻回部材1の一方の端面に接合された第1の集電端子、6は巻回部材1の他方の端面に接合された第2の集電端子であり、この第1・第2の集電端子5，6は夫々外部接続用の端子部5a，6aを設けると共に、巻回部材1の端面に接合される部分につば状に形成された平面部5b，6bを設け、かつ絶縁部材7を介して第1の集電端子5の中央の空洞部に第2の集電端子6の端子部6aを挿通させることにより、同一方向から一対の端子を取り出すように構成したものである。
【0029】8は上記巻回部材1を駆動用電解液(図示せず)と共に収納する有底筒状のケース、8aは巻回部材1を位置決め固定するためにケース8の内底面に設けられた突起、6cは絶縁部材9(無くてもコンデンサを構成することは可能)を介して上記ケース8に設けられた突起8aに嵌まり込むように第2の集電端子6に設けられた位置決め固定用の係合部である。10は上記第1の集電端子5の端子部5aが挿通する貫通穴を備えて上記ケース8の開口部を封止した封口部材、11はナット、12は圧力弁、13はOリングである。
【0030】図2は上記巻回部材1の構成を示す展開斜視図で、図2において2は一対の電極であり、この一対の電極2は集電体の露出部分2a，2bが互いに逆方向に突出するようにして、活性炭と結着剤と導電剤の混合物からなる分極性電極層3a，3bを形成して構成され、このように構成された一対の電極2間にセパレータ4を介在させた状態で巻回することにより巻回部材1が構成されている。
【0031】図3は上記巻回部材1の端面、すなわち集電体の露出部分2a，2bに集電端子を接合した状態の斜視図であり、巻回部材1の一方の端面に第1の集電端子5の平面部5bを、同他方の端面に第2の集電端子6の平面部6bを夫々接合し、同一方向から一対の端子部5a，6aを取り出したものである。
【0032】このように本実施の形態では、巻回部材1の一対の電極における集電体の露出部分2a，2bが互いに逆方向になるように一対の電極2の間にセパレータ4を介在させ、これらを巻回することにより構成するとともに、上記一対の電極2における互いに逆方向に突出する電極の端面に同方向から一対の電極が引き出されるように構成された金属製の第1・第2の集電端子5，6を金属溶射、溶接、ろう接、導電性接着剤を用いた接着の少なくとも一つを用いて接合し、一対の電極2の体積抵抗を減少させるようにしたもので、例えば(数1)を用い本発明品と従来品の電極の体積抵抗を算出して比較してみると、一対の電極2のサイズが各々98mm×3600mmで厚みが0．022mmのアルミニウム箔(アルミニウム抵抗率＝0．0265)を使用した場合、本発明の巻回部材1として逆方向に突出する電極2の集電端子の露出部分2a，2bの夫々に金属からなる第1・第2の集電端子5，6を接合した状態において、一対の電極2を構成するアルミニウム箔全体の体積抵抗を(数1)を用いて計算すると約0．02mΩとなり、一方、同じサイズの一対の電極を使用して従来のように一対の電極から各々4本のリード板を等間隔で引き出した場合における一対の電極を構成するアルミニウム箔全体の体積抵抗を同様に(数1)を用いて計算すると約0．46mΩとなるもので、この結果から明らかなように、本発明においては、一対の電極2の体積抵抗を低減することができるもので、コンデンサの内部抵抗を減少させることができる。
【0033】
【数1】

$$集電体抵抗値 = 1/(3\times n^2)\times(3\times(Lx/L-1/2)^2+1/4)\times L/W\times\rho/tp1$$

n:リード引き出し本数　Lx:電極端部とリード間の距離　L:電極長さ

W:電極幅　ρ:アルミ抵抗率　tp1:電極厚み

【0034】したがって、これを電気二重層コンデンサに応用した場合、大電流で充電もしくは放電しても、充放電における電圧の急激なダウン部分あるいはアップ部分の電圧範囲を小さくすることができるため、コンデンサのより大電流での充放電ができるもので、さらにこれをアルミ電解コンデンサに応用した場合、大電流が印加される際の製品発熱を低減することができるため、従来のアルミ電解コンデンサより高リプル電流化が可能になるもので、またこれを機能性高分子コンデンサに応用した場合、従来の巻回タイプの機能性高分子コンデンサより低インピーダンスのコンデンサを提供できるもので、電解液を使用しないためドライアップが要因の寿命劣化モードがなく、コンデンサの長寿命化を図ることができるものである。

【0035】また、実施の形態における第1・第2の集電端子5，6は、図1に示すように第1の集電端子5は中央に貫通孔を有し、かつ巻回部材1と接する面の反対方向に外部接続用の端子部5aを突出させ、第2の集電端子6は巻回部材1と接する面と同方向に外部接続用の端子部6aを突出させ、かつこの外部接続用の端子部6aが巻回部材1の中心の空洞および上記第1の集電端子5に設けた貫通孔を絶縁部材7を介して挿通するようにして巻回部材1を構成したもので、この構成によれば、筒形のコンデンサの一方の端面に陽極と陰極の両端子を容易に引き出すことができ、その結果、封止の絞り位置、絞り込み寸法等の従来の製品設計寸法や封口部材寸法、ケース寸法などの製品の各部材寸法も大幅な変更をすることなく容易に製品化できるものである。

【0036】(実施の形態2)図4は本発明の第2の実施の形態によるコンデンサの構成を示す断面図であり、本実施の形態は上記第1の実施の形態のコンデンサの第1・第2の集電端子に一体で設けられていた巻回部材の端面に接合されるつば状の平面部を別個の独立した部品として構成した点と、この平面部を除いた集電端子の残部を巻回部材を作製する際の巻芯として利用するようにしたもので、これ以外の構成は第1の実施の形態と同じであるため、同一部分については同一符号を付与してその詳細な説明は省略し、異なる部分についてのみ詳細に説明する。

【0037】図4において、17は巻回部材1の端面の集電体の露出部分2a，2bにそれぞれ接合された中空円板状の集電板、14と15は上記集電板17の中心穴に挿通されて接合される第1・第2の集電端子、16は絶縁部材、18は第1の集電端子14に接合された封口部材である。

【0038】上記第1・第2の集電端子14，15は夫々外部接続用の端子部14a，15aを設け、かつ絶縁部材16を介して第1の集電端子14の中心に設けられた貫通穴に第2の集電端子15の端子部15aを挿通させることにより、同一方向から一対の端子部14aと15aを取り出すように構成されている。

【0039】このように本実施の形態によれば、上記第1の実施の形態と同様に筒形のコンデンサの一方の端面に陽極と陰極の両端子を容易に引き出すことができ、その結果、封止の絞り位置、絞り込み寸法等の従来の製品設計寸法や封口部材寸法、ケース寸法などの製品の各部材寸法も大幅な変更をすることなく容易に製品化することができる。

【0040】また、外部接続用の端子部14aを有した棒状の第1の集電端子14(第2の集電端子15としても良い)を巻回部材1の巻芯とすることにより、芯材のない場合と比較して堅く巻くことができるために巻ずれの軽減ができ、かつ電極間の距離を短くすることができるためにコンデンサの内部抵抗を減少させることができるものである。

【0041】さらに、巻回部材1の端面の集電体の露出部分2a，2bに集電板17を夫々接合する際に、集電板17が独立した部品となっていることから周囲に障害物(第1・第2の集電端子14，15)が無いため、接合の作業が容易になり、作業性を向上させることができるものである。

【0042】(実施の形態3)図5は本発明の第3の実施の形態による集電端子の構成を示す断面図であり、本実施の形態は上記第2の実施の形態のコンデンサの第1の集電端子に封口部材の一部を一体で形成したもので、これ以外の構成は第2の実施の形態と同じであるため、同一部分については同一符号を付与してその詳細な説明は省略し、異なる部分についてのみ詳細に説明する。

【0043】図5において、19は中心に貫通穴を有し、一端に外部接続用の端子部19aを設けた第1の集電端子であり、この第1の集電端子19は図中一点鎖線で示すように封口部材が接合される位置に封口部材の一部19bを一体で設けた構成としたものである。

【0044】このような構成とすることにより、上記第1の集電端子19を巻回部材1の巻芯として使用した場合や、また第1の集電端子19を巻回部材1の空洞部内に挿入した状態でも集電板17を巻回部材1の端面の集電体の露出部分2aに接合することが可能となり、組み立て作業の自由度が大きくなるものである。

【0045】さらに、第1の集電端子19に一体成形された封口部材の一部19bと封口部材を接合することにより封止が可能であり、コンデンサの封止に必要なOリング等の部品点数が削減できるものである。

【0046】(実施の形態4)図6、図7は本発明の第4の実施の形態による集電板の構成を示す斜視図であり、本実施の形態は上記第2、第3の実施の形態のコンデンサの集電板の巻回部材と接する平面部に欠落部分あるいは凹凸部分を設けたもので、これ以外の構成は第2、第3の実施の形態と同じであるため、同一部分については同一符号を付与してその詳細な説明は省略し、異なる部分についてのみ詳細に説明する。

【0047】図6において20は集電板であり、この集電板20の巻回部材1と接する平面部にはスリット状もしくは穴状等の欠落部分20aを設けた構成としており、このように構成することにより、例えば金属溶射の方

法で巻回部材1に対し集電板20を接合する場合、その方法として巻回部材1に集電板20を押し当て、集電板20側から所定の部分に溶融された金属粉体状のものを噴射し、集電板20の平面部の欠落部分20aの端面とその端面に接している巻回部材1における集電体の露出部分2a，2bが溶射金属を媒体として接合するものであるため、金属溶射の方法で巻回部材1に対して集電板20を接合する場合には集電板20の平面部の欠落部分20aが必要不可欠である。さらに、その他の接合方法の場合、次の工程である巻回部材1への電解液の含浸の際、上記集電板20の平面部の欠落部分20aは電解液が巻回部材1へ浸入する一つの浸入経路となるものである。

【0048】また、図7は他の例を示したもので、図7において21は集電板であり、この集電板21の巻回部材部材1と接する平面部には波状もしくは隆起状の凹凸部分21aを設けた構成としており、このような構成とした場合でも、巻回部材1に対して集電板21を接合した後の次の工程である巻回部材1への電解液の含浸の際、上記集電板21の波状もしくは隆起状の凹凸部分21aは電解液が巻回部材1へ浸入する一つの浸入経路となるものである。

【0049】なお、上記本実施の形態では、集電板20または21に欠落部分20aまたは凹凸部分21aを設けた構成を例にして説明したが、本発明はこれに限定されるものでなく、例えば上記第1の実施の形態のように、巻回部材1の集電体の露出部分2a，2bに接合される平面部5b，6bを一体で設けた第1・第2の集電端子5，6の上記平面部5b，6bに同様の欠落部分20aまたは凹凸部分21aを設けても同様の効果が得られることは言うまでもない。

【0050】（実施の形態5）図8は本発明の第5の実施の形態によるコンデンサの構成を示す断面図であり、本実施の形態は上記第2の実施の形態のコンデンサのケースの内底面に設けた巻回部材の位置決め固定用の突起に代え、巻回部材の位置決め固定用の突起を集電板に設けた構成としたもので、これ以外の構成は第2の実施の形態と同じであるため、同一部分については同一符号を付与してその詳細な説明は省略し、異なる部分についてのみ詳細に説明する。

【0051】図8において22は一端に端子部22aを設けて第1の集電端子14の貫通穴に挿通された第2の集電端子、24はこの第2の集電端子22に接合された第2の集電板で、この第2の集電板24の周縁にはケース23の内底面と当接するように突起24aが設けられている。

【0052】このような構成とすることにより、有底状のケース23の内底面とそれに接する集電板24の固定ができ、コンデンサに対して外部より振動が加えられた際においても、封口部材18側に取り付けられた集電板17に対してのストレスが軽減できるために製品の耐震性を向上させることができ、かつコンデンサ使用時に内部発熱が生じた場合においても外部への放熱性を向上させることができるものである。

【0053】なお、本実施の形態についても上記実施の形態4と同様に、巻回部材1の集電体の露出部分2bに接合される平面部6bを一体で設けた第2の集電端子6を用いても同様の効果が得られることは言うまでもない。

【0054】（実施の形態6）図9は本発明の第6の実施の形態によるコンデンサの構成を示す断面図であり、本実施の形態は上記第2の実施の形態のコンデンサのケースならびに封口部材に代え、第1・第2の集電端子が接合された巻回部材を外装樹脂で被覆した構成としたもので、これ以外の構成は第2の実施の形態と同じであるため、同一部分については同一符号を付与してその詳細な説明は省略し、異なる部分についてのみ詳細に説明する。

【0055】図9において25は外装樹脂、25aは外装樹脂の内底面に設けた巻回部材1の位置決め固定用の突起であり、このような構成とすることにより、従来のようなケースの絞り加工による封止が必要でなく、巻回部材1を外装樹脂25でモールドすると同時に封止が可能であるため、従来と比較して生産工程数が削減でき、かつ従来必要とされていた封止工程における製品切り替え時の封止寸法の設定などの労力が削減でき、生産性の向上が図れると共に、使用部品点数の削減によるコストダウンを図ることができるものである。

【0056】

【発明の効果】以上のように構成される本発明のコンデンサは、集電端子は従来のリードの役目を成し、かつこの集電端子は巻回部材の端面に配置されているために一対の電極の体積抵抗を減少させることができ、これを電気二重層コンデンサに応用した場合、大電流で充電もしくは放電しても充放電における電圧の急激なダウン部分あるいはアップ部分の電圧範囲を小さくすることができ、このためにコンデンサのより大電流での充放電ができるもので、さらにこれをアルミ電解コンデンサに応用した場合、大電流が印加される際の製品発熱を低減することができるため、従来のアルミ電解コンデンサより高リプル電流化

が可能になるものである。また、これを機能性高分子コンデンサに応用した場合、従来の巻回タイプの機能性高分子コンデンサより低インピーダンスのコンデンサを提供することができるもので、電解液を使用しないためドライアップが要因の寿命劣化モードがなく、コンデンサの長寿命化を図ることができるものである。

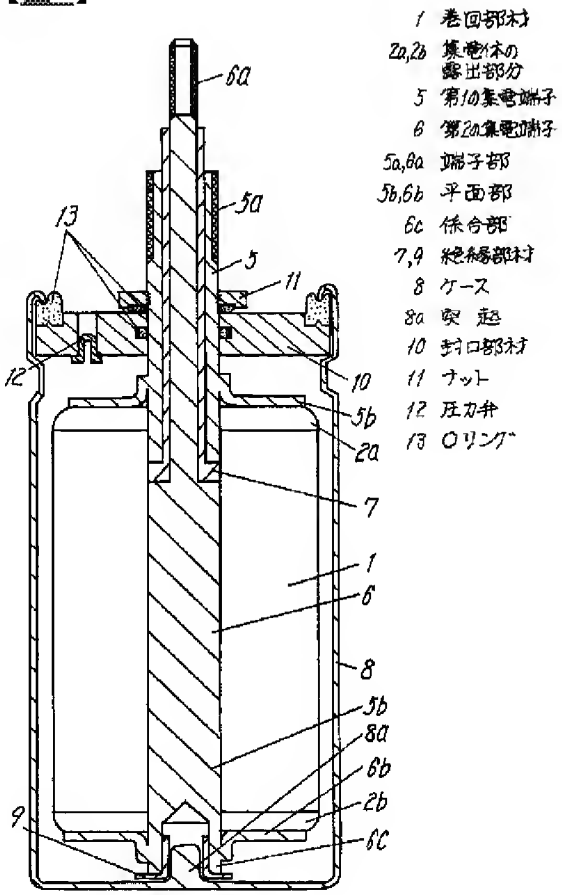
図の説明

【図面の簡単な説明】
【図1】本発明の第1の実施の形態によるコンデンサを示す断面図
【図2】同実施の形態におけるコンデンサの巻回部材を示す展開斜視図
【図3】同実施の形態における巻回部材に集電端子を接合した状態を示す斜視図
【図4】本発明の第2の実施の形態によるコンデンサを示す断面図
【図5】本発明の第3の実施の形態による集電端子を示す断面図
【図6】本発明の第4の実施の形態による集電板を示す斜視図
【図7】本発明の第4の実施の形態による集電板を示す斜視図
【図8】本発明の第5の実施の形態によるコンデンサを示す断面図
【図9】本発明の第6の実施の形態によるコンデンサを示す断面図
【図10】従来のコンデンサの構成を示す断面図
【図11】従来のコンデンサの巻回部材を示す展開斜視図
【符号の説明】
1 巻回部材
2 一対の電極
2a, 2b 集電体の露出部分
3a, 3b 分極性電極層
4 セパレータ
5 第1の集電端子
6 第2の集電端子
5a, 6a 端子部
5b, 6b 平面部
6c 係合部
7, 9 絶縁部材
8 ケース
8a 突起
10 封口部材
11 ナット
12 圧力弁
13 Oリング
14 第1の集電端子
15 第2の集電端子
14a, 15a 端子部
16 絶縁部材
17 集電板
18 封口部材
19 第1の集電端子
19a 端子部
19b 封口部材の一部
20, 21 集電板
20a 欠落部分
21a 凹凸部分
22 第2の集電端子

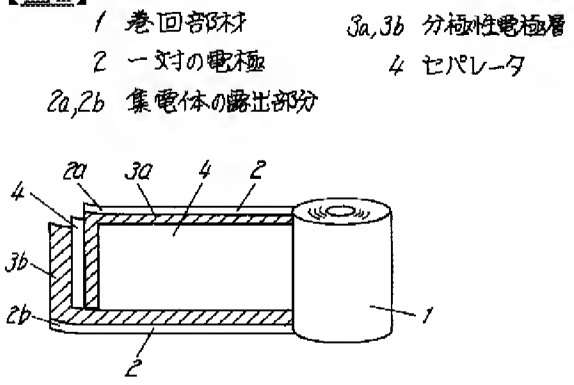
22a 端子部
23 ケース
24 第2の集電板
24a 突起
25 外装樹脂
25a 突起

図面

【図1】

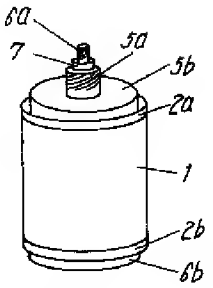


【図2】



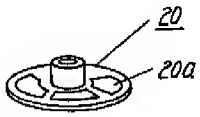
【図3】

1 巻回部材
2a,2b 集電体の露出部分
5a,6a 端子部
5b,6b 平面部
7 絶縁部材



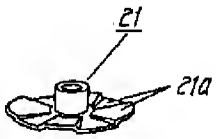
【図6】

20 集電板
20a 欠落部分

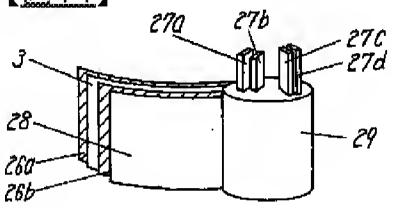


【図7】

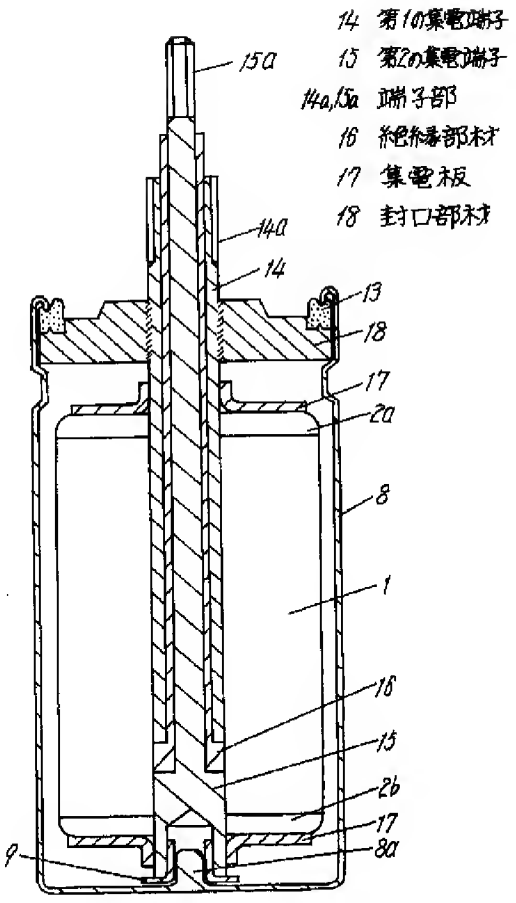
21 集電板
21a 凹凸部分



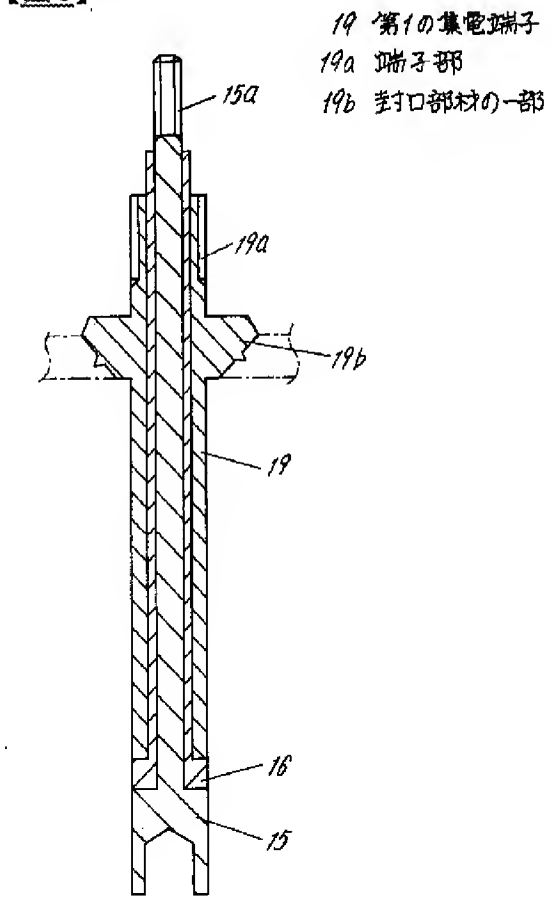
【図11】



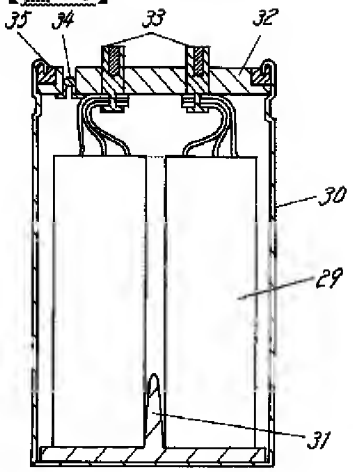
【図4】


14 第1の集電端子
15 第2の集電端子
14a,15a 端子部
16 絶縁部材
17 集電板
18 封口部材
15a
14a
14
13
18
17
2a
8
1
18
15
2b
17
8a
9

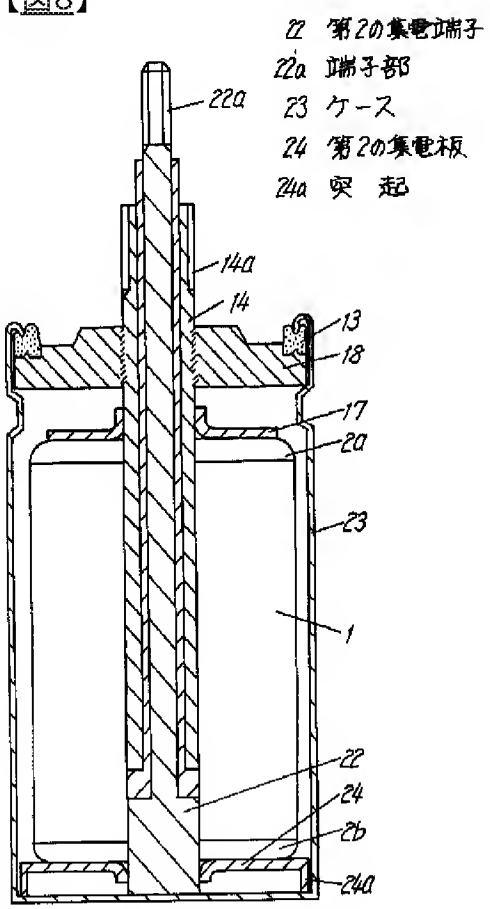
【図5】


19 第1の集電端子
19a 端子部
19b 封口部材の一部
15a
19a
19b
19
16
15

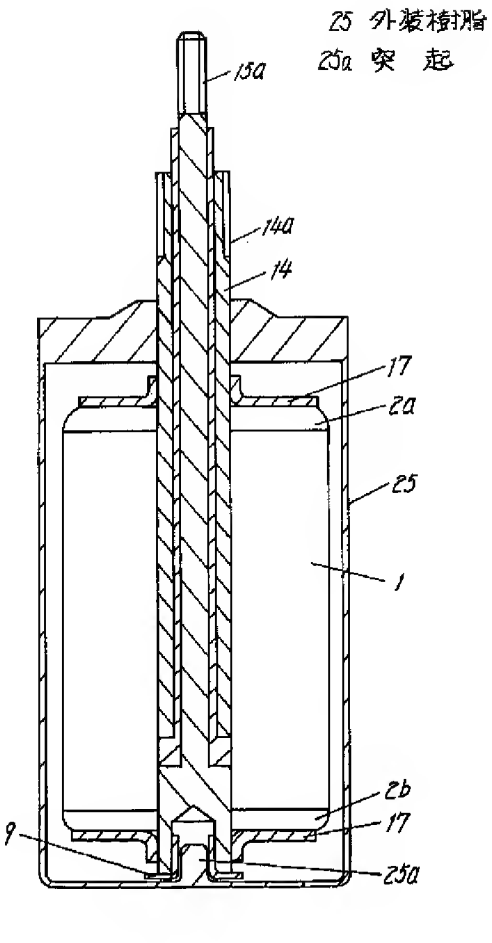
【図10】


35
34
33
32
30
29
31

【図8】


22 第2の集電端子
22a 端子部
23 ケース
24 第2の集電板
24a 突起
22a
14a
14
13
18
17
20
23
1
22
24
26
24a

【図9】


25 外装樹脂
25a 突 起
15a
14a
14
17
2a
25
1
2b
17
9
25a

PATENT ABSTRACTS OF JAPAN

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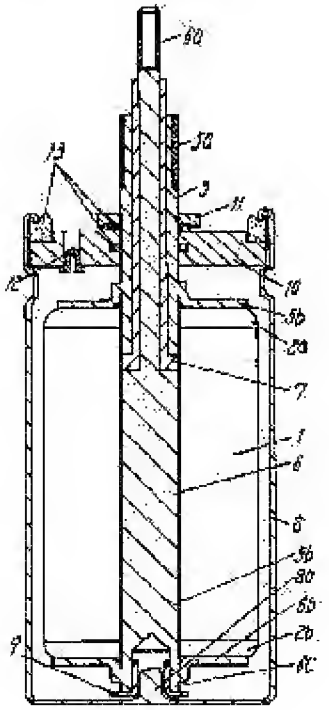
(54) **CAPACITOR**



(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a capacitor which can reduce its internal resistance and which can be easily produced even if both positive and negative terminals are drawn out in the same direction.
SOLUTION: This capacitor comprises a wound member 1 obtained by winding a pair of flat electrodes and a separator interposed therebetween together with the end faces of the electrodes projecting in directions reverse to each other, an electrolytic solution for impregnating the member 1, a case 8 for accommodating the member 1, and a sealing member 10 for sealing the opening of the case 8. Metallic collecting terminals 5 and 6 are joined to the end faces of the electrodes of the member 1 projecting in the reverse directions, the terminals 5 and 6 being formed so that the pair of electrodes are drawn out in the same direction. As a result, the internal resistance can be reduced.

CLAIMS

[Claim(s)]

[Claim 1]A winding member of hollow shape constituted when a separator was made to intervene between them, and it wound around it mutually, as the end face of each electrode projected an electrode of a plate-like couple to an opposite direction, The 1st collecting terminals of hollow shape to which a flat-surface part which was provided with a terminal area for external connection, and was formed in the shape of spittle was joined by one end face of the above-mentioned winding member, The 2nd collecting terminals to which a flat-surface part which was provided with a terminal area for external connection which inserted in the central part of the above-mentioned winding member and the central part of the 1st collecting terminals, and was provided in the 1st collecting terminals, and a terminal area for external connection pulled out by uniform direction, and was formed in the shape of spittle was joined by field of another side of a winding member, A capacitor which consists of an obturation member which provided a through hole which a terminal area for external connection which provided in a case, and the 1st collecting terminals of the above and the 2nd collecting terminals of the shape of a cylinder like object with base which stores the above-mentioned winding member with an electrolysis solution for a drive inserts in, and closed an opening of the above-mentioned case.

[Claim 2]The capacitor according to claim 1 using an electrode which forms a polarizable electrode layer as for which an exposed portion of a charge collector consists of a mixture of activated carbon, a binder, and a conducting agent so that may be formed as an electrode of a plate-like couple at an end of a charge collector on a charge collector which consists of a metallic foil or a conductive polymer.

[Claim 3]The capacitor according to claim 1 using electrode foil which consists of a metallic foil which provided a metal oxide film in the surface as an electrode of a plate-like couple.

[Claim 4]The capacitor according to claim 1 which provided a combined member which replaces with an electrolysis solution with which a separator made to intervene between electrodes of a plate-like couple and this separator are impregnated, and consists of a functional polymer molecule, or a separator and a functional polymer.

[Claim 5]The capacitor according to claim 1 which constitutes a flat part of the shape of spittle joined by the end face of a winding member of the 1st collecting terminals and the 2nd collecting terminals as parts which became independent, respectively, and joined the remainder of this independent part, the 1st collecting terminals, and the 2nd collecting terminals, respectively.

[Claim 6]The capacitor according to claim 5 which carried out integral moulding of a part of obturation member to a portion which touches an obturation member of the 1st collecting terminals that constituted a flat part of the shape of spittle which has a terminal area for external connection, and is joined by the end face of a winding member as parts which became independent, respectively.

[Claim 7]A capacitor of any one statement of claim 1-6 which provided missing parts, such as slit shape or the shape of a hole, in the flat part of parts which were separated from spittle-like a flat part or collecting terminals joined by the end face of a winding member of collecting terminals, and became independent.

[Claim 8]A capacitor of any one statement of claim 1-6 which was wavelike to the flat part of parts which were separated from spittle-like a flat part or collecting terminals joined by the end face of a winding member of collecting terminals, and became independent, or provided an uneven part of a letter of upheaval.
[Claim 9]The capacitor according to claim 1 which made a case the shape of an rectangular pipe of an owner bottom.
[Claim 10]The capacitor according to claim 1 which constituted a case, an obturation member, and a nut with metal or a polymer material.
[Claim 11]The capacitor according to claim 1 which replaces with a case and was made to carry out the mold of the winding member with sheath resin.
[Claim 12]The capacitor according to claim 1 or 9 which provided a projection for winding member immobilization in an inner bottom of a case.
[Claim 13]The capacitor according to claim 1 or 5 which provided a projection for winding member immobilization in a flat part of a flat-surface part joined to a winding member of the 2nd collecting terminals, and a counter direction.
[Claim 14]The capacitor according to claim 1 or 5 which performed processing for raising absorption of a laser beam to a flat-surface part joined to a winding member of collecting terminals.
[Claim 15]The capacitor according to claim 1 by which junction of collecting terminals and a winding member is performed using at least one of the adhesion using metallizing, welding, brazing and soldering, and electroconductive glue.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the capacitor used for various electronic equipment.
[0002]
[Description of the Prior Art]This conventional kind of capacitor is explained using a drawing.
[0003]The sectional view showing the composition of the capacitor of the former [drawing 10] and drawing 11 are the deployment perspective views showing the composition of the winding member used for the capacitor.
[0004]The lead board by which 26a and 26b were connected to the electrodes 26a and 26b of the above-mentioned plate-like couple the electrode of a plate-like couple, and 27a-27d in drawing 11, 28 is a separator and the winding member 29 is constituted by winding the electrodes 26a and 26b of a plate-like couple to which the lead boards 27a-27d were connected in this way in the state where the separator 28 was made to intervene between them.
[0005]The winding member to which the above-mentioned lead boards 27a-27d were connected 29 in drawing 10, The cylinder-like-object-with-base-like case where this winding member 29 was stored 30, the member for winding member immobilization allocated in the inner bottom of this case 29 31, The tag block in which 32 closes the opening of the above-mentioned case 30, the terminal for external connection which this

tag block 32 is equipped with 33, and is connected with the above-mentioned lead boards 27a-27d, the pressure valve in which the above-mentioned tag block 32 was equipped with 34, and 35 are O rings, and the conventional capacitor was constituted in this way.
[0006]
[Problem(s) to be Solved by the Invention]However, in the capacitor of the above-mentioned conventional composition, in the situation where the market demand about low-resistance-izing of a capacitor is increasing further in recent years, when it is going to lower the internal resistance of a capacitor, there are a method of increasing the number of sheets of the lead board 27, the method of optimizing a lead boards [27a-27d] connecting location, etc. Can reduce resistance of the electrodes 26a and 26b of the couple which constitutes the winding member 29 as the number of sheets of the lead board 27 is made to increase here according to (several 1) in the method of increasing the number of sheets of the lead board 27 in the former, but. When connecting the above-mentioned lead board 27 to the terminal 33 for external connection, In order to have to laminate two or more lead boards 27 to the terminal area of the lead board 27 of the terminal 33 and to have to connect with it, The connection number of sheets of the lead board 27 connectable with the lead board terminal area of the terminal 33 had a limit from problems, such as a size in the case 30, connection workability, and reliability, and the number of sheets of the lead board 27 had SUBJECT that it was not increased recklessly.
[0007]In the method of optimizing a latter lead boards [27a-27d] connecting location, For example, lead boards [which were connected two or more sheets / 27a-27d] distance is made the same, And when distance with the lead board 27a nearest to the electrode 26a, 26b end, and the end of these electrodes 26a and 26b is set to one half of lead boards [which were connected two or more sheets / 27a-27d] distance, the resistance of the electrodes 26a and 26b of the couple which constitutes the winding member 29 will become ideal, but. When they are actually wound, a lead boards [27a-27d] position shifts as two or more lead boards 27a-27d pulled out from each of the electrodes 26a and 26b of a couple go outside from the center. Therefore, in the latter method, the resistance of the electrodes 26a and 26b of a couple had SUBJECT that it increased from an ideal thing.
[0008]In the capacitor of composition of that this invention person proposed by Japanese Patent Application No. No. 322596 [09 to], the cylinder-like-object-with-base-like case was used, in composition of taking out both the negative pole and an anode terminal to a uniform direction, the internal structure became complicated and SUBJECT that mass production was difficult occurred.
[0009]It aims at providing a producible capacitor easily, even when this invention can solve such conventional SUBJECT, and internal resistance can be decreased and it takes out both the negative pole and an anode terminal to a uniform direction.
[0010]
[Means for Solving the Problem]A winding member of hollow shape constituted when it wound around it mutually, as this invention makes a separator an electrode of a plate-like couple intervene between them in order to solve an aforementioned problem, and the end face of each electrode projected to an opposite direction, The 1st collecting terminals of hollow shape to which a flat-surface part which was provided with a terminal area for external connection, and was formed in the shape of spittle was joined by one end face of

the above-mentioned winding member, The 2nd collecting terminals to which a flat-surface part which was provided with a terminal area for external connection which inserted in the central part of the above-mentioned winding member and the central part of the 1st collecting terminals, and was provided in the 1st collecting terminals, and a terminal area for external connection pulled out by uniform direction, and was formed in the shape of spittle was joined by field of another side of a winding member, It has composition which consists of an obturation member which provided a through hole which a terminal area for external connection which provided in a case, and the 1st collecting terminals of the above and the 2nd collecting terminals of the shape of a cylinder like object with base which stores the above-mentioned winding member with an electrolysis solution for a drive inserts in, and closed an opening of the above-mentioned case.

[0011]Even when volume resistance of an electrode of a couple in a capacitor can be decreased and it takes out both the negative pole and an anode terminal to a uniform direction by this this invention, it becomes producible easily.

[0012]

[Embodiment of the Invention]The winding member of the hollow shape constituted when the invention of this invention according to claim 1 made a separator intervene between them, and it wound around it mutually, as the end face of each electrode projected the electrode of a plate-like couple to an opposite direction, The 1st collecting terminals of hollow shape to which the flat-surface part which was provided with the terminal area for external connection, and was formed in the shape of spittle was joined by one end face of the above-mentioned winding member, The 2nd collecting terminals to which the flat-surface part which was provided with the terminal area for the external connection which inserted in the central part of the above-mentioned winding member and the central part of the 1st collecting terminals, and was provided in the 1st collecting terminals, and the terminal area for external connection pulled out by the uniform direction, and was formed in the shape of spittle was joined by the field of another side of a winding member, It has composition which consists of an obturation member which provided the through hole which the terminal area for external connection which provided in a case, and the 1st collecting terminals of the above and the 2nd collecting terminals of the shape of a cylinder like object with base which stores the above-mentioned winding member with the electrolysis solution for a drive inserts in, and closed the opening of the above-mentioned case, Since these collecting terminals accomplish the conventional lead board and the duty of an external terminal since the collecting terminals which become the end face of the electrode of a winding member from metal by this composition are joined, and these collecting terminals are arranged in the end face of the winding member, it has the operation that the volume resistance of the electrode of a couple can be decreased. It has the operation that both the terminals of the anode and the negative pole can be easily pulled out to one end face of a capacitor.

[0013]In the invention according to claim 1, the invention according to claim 2 as an electrode of a plate-like couple, It has composition using the electrode which forms the polarizable electrode layer as for which the exposed portion of a charge collector consists of a mixture of activated carbon, a binder, and a conducting agent so that may be formed at the end of a charge collector on the charge collector which consists of a metallic foil or a conductive polymer, According to this composition, it is what can be used as an electric

double layer capacitor using the electric double layer formed by the interface of a polarizable electrode layer, Even if the use as a secondary power supply for motor drives for which low resistance is needed is attained with large scale and it charges or discharges by a high current by reduction of the internal resistance of an electric double layer capacitor, Since the voltage range of the rapid down portion of the voltage in charge and discharge or a rise portion can be made small, it has the operation that the charge and discharge in a high current can be performed from that of a capacitor.

[0014]The invention according to claim 3 has composition using the electrode foil which consists of a metallic foil which provided the metal oxide film in the surface as an electrode of a plate-like couple in the invention according to claim 1, and according to this composition. For example, it is what can be used as an aluminium electrolytic condenser when the metallic material of an electrode is made into aluminum, Since product generation of heat in the case of the use as an aluminium electrolytic condenser for inverter circuits mainly to be high-ripple-current-ized being attained, and impressing a high current by reduction of the internal resistance of an aluminium electrolytic condenser can be reduced, It has the operation that high ripple current-ization is attained from the conventional aluminium electrolytic condenser.

[0015]The invention according to claim 4 is replaced with the electrolysis solution with which the separator made to intervene between the electrodes of a plate-like couple and this separator are impregnated in the invention according to claim 1, Have composition using the combined member which consists of a functional polymer molecule, or a separator and a functional polymer, and according to this composition. It can be used as a functional polymer capacitor and the capacitor of low impedance can be provided from a functional polymer capacitor conventional winding type, In order not to use the electrolysis solution for a drive, a dry rise does not have the life degradation mode of a factor, and has the operation that reinforcement of a capacitor can be attained.

[0016]The invention according to claim 5 constitutes the flat part of the shape of spittle joined by the end face of the winding member of the 1st collecting terminals and the 2nd collecting terminals in the invention according to claim 1 as parts which became independent, respectively, It is a thing of composition of having joined the remainder of this independent part, the 1st collecting terminals, and the 2nd collecting terminals, respectively, According to this composition, both the terminals of the anode and the negative pole can be easily pulled out to one end face of the capacitor of a cartridge, As a result, it is what can be produced commercially easily without making a change also with each large member size of products, such as the conventional product-design sizes, such as a diaphragm position of closure, and a narrowing-down size, an obturation member size, a case size, By using the remainder of collecting terminals with the terminal area further for external connection as the winding core of a winding member, Since it can wind firmly as compared with the case where there is no core material, and mitigation of weaving can be performed and inter-electrode distance can be shortened, it has the operation that the internal resistance of a capacitor can be decreased.

[0017]The invention according to claim 6 has a terminal area for external connection in the invention according to claim 5, And it is a thing of composition of having carried out integral moulding of a part of obturation member to the portion which touches the obturation member of the 1st collecting terminals that constituted the flat part of the shape of spittle joined by the end face of a winding member as independent parts,

According to this composition, it can obturate by joining a part of obturation member and the obturation member by which integral moulding was carried out to the remainder of the 1st collecting terminals, and has the operation that part mark required for obturation of a capacitor are reducible.

[0018]In the invention of any one statement of claim 1-6 the invention according to claim 7, It is what was considered as the composition which provided missing parts, such as slit shape or the shape of a hole, in the flat part of the parts which were separated from spittle-like the flat part or collecting terminals joined by the end face of the winding member of collecting terminals, and became independent, When collecting terminals are joined, for example to a winding member by the method of metallizing according to this composition, Press collecting terminals against a winding member as the method, and the thing of the shape of metal powder by which melting was carried out to the predetermined portion from the collecting-terminals side is injected, Since the exposed portion of the charge collector of the winding member which is in contact with the end face and this end face of a missing part of collecting terminals is what joins thermal-spraying metal as a medium, [of a flat part] In the case where the missing part of the flat part of collecting terminals is indispensable, and are other joining methods when joining collecting terminals to a winding member by the method of metallizing, In the case of being impregnated of the electrolysis solution to the winding member which is the following process, the missing part of the flat part of the above-mentioned collecting terminals has the operation that it is a thing used as one permeation course in which an electrolysis solution infiltrates into a winding member.

[0019]In the invention of any one statement of claim 1-6 the invention according to claim 8, It is what was considered as the composition which was wavelike to the flat part of the parts which were separated from spittle-like the flat part or collecting terminals joined by the end face of the winding member of collecting terminals, and became independent, or provided the uneven part of the letter of upheaval, According to this composition, it has wavelike or the operation of the above-mentioned collecting terminals that the uneven part of the letter of upheaval becomes one permeation course in which an electrolysis solution infiltrates into a winding member, in the case of being impregnated of the electrolysis solution to the winding member which is the next process after joining collecting terminals to a winding member.

[0020]The invention according to claim 9 is what made the case the shape of an rectangular pipe of an owner bottom in the invention according to claim 1, When using it as a bank which has arranged the capacitor densely in in-series, for example according to this composition, if charge and discharge are repeatedly performed to the bank of a capacitor with the current of the level more than several 10A, generation of heat will arise inside a capacitor, but. When a case is tubed, the touch area of the case sides of a capacitor as compared with the case where it is corniform Since it is small, When heat dissipation to the exterior can be made easy and a case is corniform on the other hand, Since the pressure buildup inside a case can be eased also when an internal opening becomes large as compared with the case of being cylindrical, for example, an electrolysis solution decomposes by the excess voltage over a capacitor and the rapid generation of gas arises, the operating time of the pressure valve arranged by the obturation board is delayable. In the case where what carried out the opening of an owner bottom or the both ends for the case is used, The terminal of the anode is allocated in one

end face of the structure which allocated both the terminals of the anode and the negative pole in one end face of a capacitor, or a capacitor, And the capacitor of the structure which allocated the terminal of the negative pole in the end face of another side can be obtained, and this has the operation that it is what can respond according to the junction state of a capacitor and an electric circuit.

[0021]The invention according to claim 10 is what constituted the case, the obturation member, and the nut with metal or a polymer material in the invention according to claim 1, When using the case which consists of metal according to this composition, obturation by the diaphragm construction method of the case generally used as present obturation member is possible, In the obturation method, do not need a large change, and when an obturation member is [and] a metallic member, although an insulation is required by an insulation process or insertion of an insulating member in the plane of composition of the obturation member which consists of the terminal part and the above-mentioned metal of collecting terminals, Junction of arc welding of the case which consists of an obturation member which consists of the above-mentioned metal, and metal, etc. is possible, According to this composition, by using thermally conductive good metal for an obturation member for the heat generated inside the capacitor by charge and discharge etc., heat dissipation to the exterior is made easy, and part mark, such as an O ring, can be reduced. Also when the case which consists of polymers is used, obturation by the diaphragm construction method of a case is possible, and junction of the ultrasonic welding of the case which consists of an obturation member which consists of the above-mentioned polymers, and polymers when an obturation member is a polymers member, etc. is possible, and part mark, such as an O ring, can be reduced. Although a nut uses the nut which usually consists of metal, when using the obturation member which uses the nut which consists of polymers and consists of polymers, an obturation member can be joined to a nut by ultrasonic welding etc., and it has the operation that it is what can reduce part mark, such as an O ring.

[0022]The invention according to claim 11 is what replaces with a case and was made to carry out the mold of the winding member with sheath resin in the invention according to claim 1, According to this composition, closure by the spinning of a case like before is not required, and simultaneously with the resin molding of a winding member Since it can obturate, The number of production processes can be reduced as compared with the former, and the work of setting out of the obturation size at the time of the product change in the obturation process needed conventionally, etc. can be reduced, and it has the operation that improvement in productivity can be aimed at.

[0023]The invention according to claim 12 is what provided the projection for winding member immobilization in the inner bottom of the case in the invention according to claim 1 or 9, According to this composition, immobilization of the portion of the bottom of the inner surface of a closed-end case and the collecting terminals which touch it can be performed, Since the stress to the collecting terminals attached to the obturation member side can be reduced when vibration is added from the exterior to a capacitor, When the earthquake resistance of a product can be raised and internal generation of heat arises at the time of capacitor use, it has the operation that the heat dissipation nature to the exterior can be raised.

[0024]The invention according to claim 13 is what provided the projection for winding member immobilization in the flat part of the flat-surface part joined to the winding

member of the 2nd collecting terminals, and a counter direction in the invention according to claim 1 or 5, Since according to this composition the stress to the collecting terminals attached to the obturation member side can be reduced when immobilization of the portion of the bottom of a closed-end case inner surface and the collecting terminals which touch it is completed and vibration is added from the exterior to a capacitor, When the earthquake resistance of a product can be raised and internal generation of heat arises at the time of capacitor use, it has the operation that the heat dissipation nature to the exterior can be raised.

[0025]The invention according to claim 14 is what performed processing for raising absorption of a laser beam to the flat-surface part joined to the winding member of collecting terminals in the invention according to claim 1 or 5, The processing for raising absorption of a laser beam to the field which is in contact with the end face of the winding member by this composition in the flat plate part which touches the winding member of collecting terminals, for example, and the field of a counter direction, For example, an electrochemical etching process or the deposition treatment of a metallic oxide, Or when the field of the side which performed the processing was irradiated with the laser beam and it welds with the end face of a capacitor element, after performing blast processing etc., Since absorption of a laser beam is good as compared with the case where it does not process, it can weld with low energy, and it has the operation that the interval of an exposure of a laser beam can be shortened and productivity can be raised.

[0026]The invention according to claim 15 is what was considered as collecting terminals and the composition performed using at least one of the adhesion using metallizing, welding, brazing and soldering, and electroconductive glue of junction of a winding member in the invention according to claim 1, It is what injects the thing of the shape of metal powder in the case of metallizing pressed collecting terminals against the winding member as that method, and melting was carried out to the predetermined portion from the collecting-terminals side by this composition of, Since operation with easy firm junction can perform when weaving of the winding member has arisen according to this method, smooth production is attained. It is what in welding presses collecting terminals against a winding member as the method, for example, applies laser to a predetermined portion from the collecting-terminals side, and joins the portion, When according to this method control of a joining section is easy and an electrolysis solution is impregnated with it to the winding member after collecting-terminals junction, The electrolysis solution in the circumference of the winding member after collecting-terminals junction can infiltrate into the inside of a winding member easily, and the electrolysis solution which is the following process can be impregnated in a short time. By the construction method which in the adhesion using brazing and soldering and electroconductive glue allots a joining member and connects between collecting terminals and a winding member. When control of a joining section is easy and an electrolysis solution is impregnated with it to the winding member after collecting-terminals junction like the case of the above-mentioned welding, The electrolysis solution in the circumference of the winding member after collecting-terminals junction can infiltrate into the inside of a winding member easily, and the electrolysis solution which is the following process can be impregnated in a short time. Although metallizing junction joins by injecting a metal powder-like thing as an example in the case of furthermore using together, for example and a PORASU portion exists in a joining section, When it is filled up there with a

conductive material and solidifies, it has the operation that the connection resistance of an electrode and collecting terminals can be decreased further, and the internal resistance of a capacitor can also be decreased further by this.
[0027]Hereafter, an embodiment of the invention is described using a drawing.
[0028](Embodiment 1) The sectional view showing the composition of the capacitor according [drawing 1] to a 1st embodiment of this invention, the deployment perspective view of the winding member by which drawing 2 is used for the capacitor, and drawing 3 are the perspective views in the state where collecting terminals were joined to the winding member. The 1st collecting terminals to which 1 was joined to the winding member and 5 was joined by one end face of this winding member 1 in drawing 1, 6 is the 2nd collecting terminals joined by the end face of another side of the winding member 1, and these 1st-2nd collecting terminals 5 and 6 form the terminal areas 5a and 6a for external connection, respectively, and. By forming the flat-surface parts 5b and 6b formed in the portion joined by the end face of the winding member 1 in the shape of spittle, and making the terminal area 6a of the 2nd collecting terminals 6 insert in the hollow part of the center of the 1st collecting terminals 5 via the insulating member 7, it constitutes so that the terminal of a couple may be taken out from a uniform direction.
[0029]The cylinder-like-object-with-base-like case where 8 stores the above-mentioned winding member 1 with the electrolysis solution for a drive (not shown), In order that 8a may carry out the positioning fix of the winding member 1, the projection provided in the inner bottom of the case 8 and 6c are the engagement parts for positioning fixes provided in the 2nd collecting terminals 6 so that it might fit into the projection 8a provided in the above-mentioned case 8 via the insulating member 9 (it is possible to constitute a capacitor even if there is nothing). As for the obturation member which 10 was provided with the through hole which the terminal area 5a of the 1st collecting terminals 5 of the above inserts in, and closed the opening of the above-mentioned case 8, and 11, a pressure valve and 13 are O rings a nut and 12.
[0030]Drawing 2 is a deployment perspective view showing the composition of the above-mentioned winding member 1, 2 is an electrode of a couple in drawing 2, and it is made, as for the electrode 2 of this couple, for the exposed portion 2a of a charge collector and 2b to project to an opposite direction mutually, The winding member 1 is constituted by winding in the state where the separator 4 was made to intervene between the electrodes 2 of the couple which formed the polarizable electrode layers 3a and 3b which consist of a mixture of activated carbon, a binder, and a conducting agent, was constituted, and was constituted in this way.
[0031]Drawing 3 is the end face 2a of the above-mentioned winding member 1, i.e., the exposed portion of a charge collector, and a perspective view in the state where collecting terminals were joined to 2b, The flat-surface part 5b of the 1st collecting terminals 5 is joined to one end face of the winding member 1, the flat-surface part 6b of the 2nd collecting terminals 6 is joined to the end face of the another side, respectively, and the terminal areas 5a and 6a of a couple are taken out from a uniform direction.
[0032]Thus, while constituting from this embodiment by making the separator 4 intervene between the electrodes 2 of a couple so that the exposed portion 2a of the charge collector in the electrode of the couple of the winding member 1 and 2b may become an opposite direction mutually, and winding these, The 1st-2nd metal collecting terminals 5 and 6 constituted so that the electrode of a couple might be pulled out by the

end face of the electrode in the electrode 2 of the above-mentioned couple which projects to an opposite direction mutually from said Metallizing, It is the thing joins using at least one of the adhesion using welding, brazing and soldering, and electroconductive glue, and it was made to decrease the volume resistance of the electrode 2 of a couple, For example, if the volume resistance of the electrode of elegance is computed and compared this invention article and conventionally using (several 1), When the size of the electrode 2 of a couple uses 0.022-mm-thick aluminium foil (aluminum resistivity =0.0265) at 98 mm x 3600 mm respectively, In the state where the exposed portion 2a of the collecting terminals of the electrode 2 which projects to an opposite direction as the winding member 1 of this invention, and the 1st-2nd collecting terminals 5 and 6 that become each of 2b from metal were joined, When the volume resistance of the whole aluminium foil which constitutes the electrode 2 of a couple is calculated using (several 1), it is set to about 0.02-mohm and on the other hand, When the volume resistance of the whole aluminium foil which constitutes the electrode of the couple at the time of pulling out four lead boards at equal intervals respectively is calculated from the electrode of a couple by using (several 1) for it to the appearance like before using the electrode of the couple of the same size, it is about 0.46-m the thing used as ohm, In this invention, the volume resistance of the electrode 2 of a couple can be reduced and the internal resistance of a capacitor can be decreased so that clearly from this result.
[0033]
[Equation 1]

[0034]Therefore, since the voltage range of the rapid down portion of the voltage in charge and discharge or a rise portion can be made small even if it charges or discharges by a high current when this is applied to an electric double layer capacitor, Since product generation of heat at the time of a high current being impressed can be reduced when the charge and discharge in a high current can be performed and this is further applied to an aluminium electrolytic condenser from that of a capacitor, It is a thing to which high ripple current-ization is attained from the conventional aluminium electrolytic condenser, When this is applied to a functional polymer capacitor, it is what can provide the capacitor of low impedance from a functional polymer capacitor conventional winding type, Since an electrolysis solution is not used, a dry rise does not have the life degradation mode of a factor, and can attain reinforcement of a capacitor.
[0035]The 1st-2nd collecting terminals 5 and 6 in an embodiment, The terminal area 5a for external connection is made to project to the counter direction of the field which the 1st collecting terminals 5 have a breakthrough in the center as shown in drawing 1, and touches the winding member 1, The 2nd collecting terminals 6 make the terminal area 6a for external connection project in the field and the direction which touch the winding member 1, And it is what constituted the winding member 1 as the terminal area 6a for these external connection inserted in the breakthrough provided in the central cave and the 1st collecting terminals 5 of the above of the winding member 1 via the insulating member 7, According to this composition, both the terminals of the anode and the negative pole can be easily pulled out to one end face of the capacitor of a cartridge, As a

result, it can produce commercially easily, without making a change also with each large member size of products, such as the conventional product-design sizes, such as a diaphragm position of closure, and a narrowing-down size, an obturation member size, a case size.

[0036](Embodiment 2) Drawing 4 is a sectional view showing composition of a capacitor by a 2nd embodiment of this invention, A point which constituted a flat-surface part of the shape of spittle joined by the end face of a winding member where this embodiment was provided in the 1st-2nd collecting terminals of a capacitor of a 1st embodiment of the above by one as separate independent parts, It is what used the remainder of collecting terminals except this flat-surface part as a winding core at the time of producing a winding member, and since composition of those other than this is the same as a 1st embodiment, identical codes are given about identical parts, that detailed explanation is omitted, and only a different portion is explained to details.

[0037]A hollow disc-like collecting electrode plate to which 17 was joined by the exposed portion 2a of a charge collector of the end face of the winding member 1, and 2b in drawing 4, respectively, It is the obturation member by which the 1st-2nd collecting terminals that 14 and 15 are inserted in a center hole of the above-mentioned collecting electrode plate 17, and are joined, and 16 were joined to an insulating member, and 18 was joined to the 1st collecting terminals 14.

[0038]The 1st-2nd collecting terminals 14 and 15 of the above form the terminal areas 14a and 15a for external connection, respectively, And by making the terminal area 15a of the 2nd collecting terminals 15 insert in a through hole provided in the center of the 1st collecting terminals 14 via the insulating member 16, it is constituted so that the terminal areas 14a and 15a of a couple may be taken out from a uniform direction.

[0039]Thus, according to this embodiment, both terminals of the anode and the negative pole can be easily pulled out to one end face of a capacitor of a cartridge like a 1st embodiment of the above, As a result, it can produce commercially easily, without making a change also with each large member size of products, such as the conventional product-design sizes, such as a diaphragm position of closure, and a narrowing-down size, an obturation member size, a case size.

[0040]By using the 1st cylindrical collecting terminals 14 (good also as the 2nd collecting terminals 15) with the terminal area 14a for external connection as a winding core of the winding member 1, Since mitigation of a volume gap can be performed since it can wind firmly as compared with a case where there is no core material, and inter-electrode distance can be shortened, internal resistance of a capacitor can be decreased.

[0041]In order that there may be no obstacle (the 1st-2nd collecting terminals 14 and 15) in the circumference since it is the parts which the collecting electrode plate 17 became independent of when joining the collecting electrode plate 17 to the exposed portion 2a of a charge collector of the end face of the winding member 1, and 2b, respectively, Work of junction can become easy and workability can be raised.

[0042](Embodiment 3) Drawing 5 is a sectional view showing composition of collecting terminals by a 3rd embodiment of this invention, and this embodiment is what formed a part of obturation member in the 1st collecting terminals of a capacitor of a 2nd embodiment of the above by one, Since composition of those other than this is the same as a 2nd embodiment, identical codes are given about identical parts, the detailed explanation is omitted, and only a different portion is explained to details.

[0043]In drawing 5, 19 has a through hole at the center, it is the 1st collecting terminals that formed the terminal area 19a for external connection in an end, and these 1st collecting terminals 19 are considered as composition which formed a part of obturation member 19b in a position to which an obturation member is joined as a dashed dotted line in a figure shows by one.
[0044]A case where the 1st collecting terminals 19 of the above are used as a winding core of the winding member 1 by having such composition, Also where the 1st collecting terminals 19 are inserted into a hollow part of the winding member 1, it becomes possible to join the collecting electrode plate 17 to the exposed portion 2a of a charge collector of the end face of the winding member 1, and flexibility of assembling work becomes large.
[0045]It can close by joining a part of obturation member 19b and an obturation member by which integral moulding was carried out to the 1st collecting terminals 19, and part mark, such as an O ring required for closure of a capacitor, can be reduced.
[0046](Embodiment 4) Drawing 6 and drawing 7 are the perspective views showing composition of a collecting electrode plate by a 4th embodiment of this invention, This embodiment is what provided a missing part or a concavo-convex portion in a flat-surface part which touches a winding member of a collecting electrode plate of a capacitor of a 2nd and 3rd embodiment of the above, Since composition of those other than this is the same as a 2nd and 3rd embodiment, identical codes are given about identical parts, the detailed explanation is omitted, and only a different portion is explained to details.
[0047]By 20 having composition which formed the missing parts 20a, such as slit shape or the shape of a hole, in drawing 6 at a flat-surface part which is a collecting electrode plate and touches the winding member 1 of this collecting electrode plate 20, and constituting in this way, For example, when the collecting electrode plate 20 is joined to the winding member 1 by a method of metallizing, Press the collecting electrode plate 20 against the winding member 1 as the method, and a thing of the shape of metal powder by which melting was carried out to a predetermined portion from the collecting electrode plate 20 side is injected, Since the exposed portion 2a of a charge collector in the winding member 1 which is in contact with the end face and the end face of the missing part 20a of a flat-surface part of the collecting electrode plate 20, and 2b are what joins thermal-spraying metal as a medium, When joining the collecting electrode plate 20 to the winding member 1 by a method of metallizing, the missing part 20a of a flat-surface part of the collecting electrode plate 20 is indispensable. In the case of other joining methods, the missing part 20a of a flat-surface part of the above-mentioned collecting electrode plate 20 becomes one permeation course in which an electrolysis solution infiltrates into the winding member 1, in the case of being impregnated of an electrolysis solution to the winding member 1 which is the following process.
[0048]Drawing 7 is what showed other examples, and 21 is a collecting electrode plate in drawing 7, It has composition which was wavelike in a flat-surface part which touches the winding member member 1 of this collecting electrode plate 21, or formed the concavo-convex portion 21a of a letter of upheaval, Even when it has such composition, the concavo-convex portion 21a of a letter of upheaval is wavelike or a thing used as one permeation course in which an electrolysis solution infiltrates into the winding member 1 of the above-mentioned collecting electrode plate 21, in the case of being impregnated of an electrolysis solution to the winding member 1 which is the next process after joining

the collecting electrode plate 21 to the winding member 1.
[0049]Although composition which formed the missing part 20a or the concavo-convex portion 21a in the collecting electrode plate 20 or 21 was made into an example and explained by this above-mentioned embodiment, This invention is not limited to this and, for example like a 1st embodiment of the above, Even if it forms the exposed portion 2a of a charge collector of the winding member 1, the same missing part 20a as the above-mentioned flat-surface parts 5b and 6b of the 1st-2nd collecting terminals 5 and 6 that formed the flat-surface parts 5b and 6b joined by 2b by one, or the concavo-convex portion 21a, it cannot be overemphasized that same effect is acquired.
[0050](Embodiment 5) Drawing 8 is a sectional view showing composition of a capacitor by a 5th embodiment of this invention, It is what was considered as composition which replaced this embodiment with a projection for positioning fixes of a winding member provided in an inner bottom of a case of a capacitor of a 2nd embodiment of the above, and provided a projection for positioning fixes of a winding member in a collecting electrode plate, Since composition of those other than this is the same as a 2nd embodiment, identical codes are given about identical parts, the detailed explanation is omitted, and only a different portion is explained to details.
[0051]The 2nd collecting terminals that 22 formed the terminal area 22a in an end in drawing 8, and were inserted in a through hole of the 1st collecting terminals 14, and 24 are the 2nd collecting electrode plate joined to these 2nd collecting terminals 22, and the projection 24a is formed in a periphery of this 2nd collecting electrode plate 24 so that an inner bottom of the case 23 may be contacted.
[0052][when immobilization of an inner bottom of the owner bottom-like case 23 and the collecting electrode plate 24 which touches it is completed and vibration is added from the exterior to a capacitor by having such composition], Since stress to the collecting electrode plate 17 attached to the obturation member 18 side is mitigable, when the earthquake resistance of a product can be raised and internal generation of heat arises at the time of capacitor use, heat dissipation nature to the exterior can be raised.
[0053]Even if it uses the 2nd collecting terminals 6 that formed the flat-surface part 6b joined by exposed portion 2b of a charge collector of the winding member 1 by one like [embodiment / this] the above-mentioned Embodiment 4, it cannot be overemphasized that same effect is acquired.
[0054](Embodiment 6) Drawing 9 is a sectional view showing composition of a capacitor by a 6th embodiment of this invention, It is what was considered as composition which covered with sheath resin a winding member which replaced this embodiment with a case and an obturation member of a capacitor of a 2nd embodiment of the above, and to which the 1st-2nd collecting terminals were joined, Since composition of those other than this is the same as a 2nd embodiment, identical codes are given about identical parts, the detailed explanation is omitted, and only a different portion is explained to details.
[0055]By being the projection for positioning fixes of the winding member 1 which provided 25 in sheath resin and provided 25a in an inner bottom of sheath resin in drawing 9, and having such composition, At the same time closure by spinning of a case like before is not required and carries out the mold of the winding member 1 with the sheath resin 25 Since it can close, The number of production processes can be reduced as compared with the former, and labors, such as setting out etc. of a closure size at the time of a product change in a sealing process needed conventionally, can be reduced, and

improvement in productivity can be aimed at, and a cost cut by reduction of using section article mark can be aimed at.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, in the capacitor of the above-mentioned conventional composition, in the situation where the market demand about low-resistance-izing of a capacitor is increasing further in recent years, when it is going to lower the internal resistance of a capacitor, there are a method of increasing the number of sheets of the lead board 27, the method of optimizing a lead boards [27a-27d] connecting location, etc. Can reduce resistance of the electrodes 26a and 26b of the couple which constitutes the winding member 29 as the number of sheets of the lead board 27 is made to increase here according to (several 1) in the method of increasing the number of sheets of the lead board 27 in the former, but. When connecting the above-mentioned lead board 27 to the terminal 33 for external connection, In order to have to laminate two or more lead boards 27 to the terminal area of the lead board 27 of the terminal 33 and to have to connect with it, The connection number of sheets of the lead board 27 connectable with the lead board terminal area of the terminal 33 had a limit from problems, such as a size in the case 30, connection workability, and reliability, and the number of sheets of the lead board 27 had SUBJECT that it was not increased recklessly.

[0007]In the method of optimizing a latter lead boards [27a-27d] connecting location, For example, lead boards [which were connected two or more sheets / 27a-27d] distance is made the same, And when distance with the lead board 27a nearest to the electrode 26a, 26b end, and the end of these electrodes 26a and 26b is set to one half of lead boards [which were connected two or more sheets / 27a-27d] distance, the resistance of the electrodes 26a and 26b of the couple which constitutes the winding member 29 will become ideal, but. When they are actually wound, a lead boards [27a-27d] position shifts as two or more lead boards 27a-27d pulled out from each of the electrodes 26a and 26b of a couple go outside from the center. Therefore, in the latter method, the resistance of the electrodes 26a and 26b of a couple had SUBJECT that it increased from an ideal thing.

[0008]In the capacitor of composition of that this invention person proposed by Japanese Patent Application No. No. 322596 [09 to], the cylinder-like-object-with-base-like case was used, in composition of taking out both the negative pole and an anode terminal to a uniform direction, the internal structure became complicated and SUBJECT that mass production was difficult occurred.

[0009]It aims at providing a producible capacitor easily, even when this invention can solve such conventional SUBJECT, and internal resistance can be decreased and it takes out both the negative pole and an anode terminal to a uniform direction.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

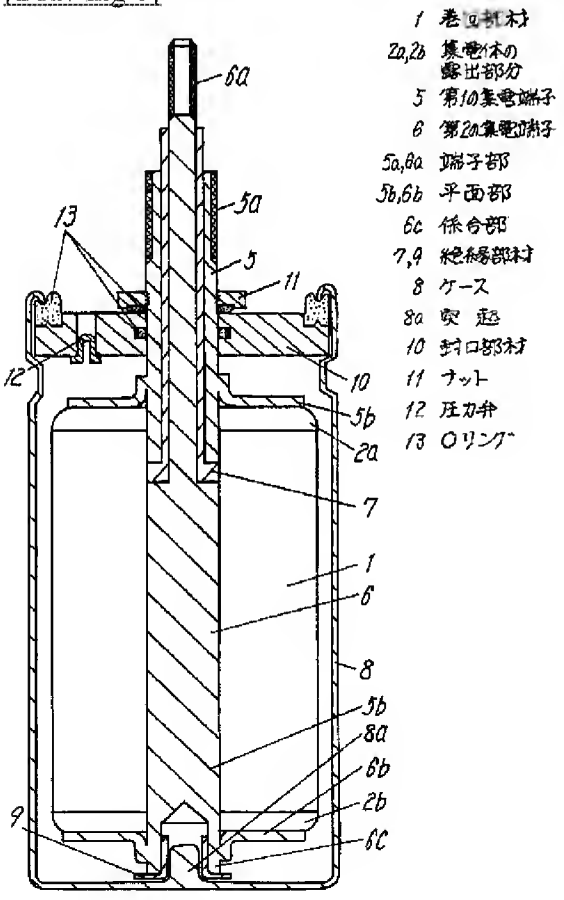
[Drawing 1]The sectional view showing the capacitor by a 1st embodiment of this invention

[Drawing 2]The deployment perspective view showing the winding member of the capacitor in the embodiment
[Drawing 3]The perspective view showing the state where collecting terminals were joined to the winding member in the embodiment
[Drawing 4]The sectional view showing the capacitor by a 2nd embodiment of this invention
[Drawing 5]The sectional view showing the collecting terminals by a 3rd embodiment of this invention
[Drawing 6]The perspective view showing the collecting electrode plate by a 4th embodiment of this invention
[Drawing 7]The perspective view showing the collecting electrode plate by a 4th embodiment of this invention
[Drawing 8]The sectional view showing the capacitor by a 5th embodiment of this invention
[Drawing 9]The sectional view showing the capacitor by a 6th embodiment of this invention
[Drawing 10]The sectional view showing the composition of the conventional capacitor
[Drawing 11]The deployment perspective view showing the winding member of the conventional capacitor
[Description of Notations]
1 Winding member
2 The electrode of a couple
2a and 2b Exposed portion of a charge collector
3a and 3b Polarizable electrode layer
4 Separator
5 The 1st collecting terminals
6 The 2nd collecting terminals
5a and 6a Terminal area
5b and 6b Flat-surface part
6c Engagement part
7 and 9 Insulating member
8 Case
8a Projection
10 Obturation member
11 Nut
12 Pressure valve
13 O ring
14 The 1st collecting terminals
15 The 2nd collecting terminals
14a and 15a Terminal area
16 Insulating member
17 Collecting electrode plate
18 Obturation member
19 The 1st collecting terminals
19a Terminal area
19b A part of obturation member

20 and 21 Collecting electrode plate
20a Missing part
21a A concavo-convex portion
22 The 2nd collecting terminals
22a Terminal area
23 Case
24 The 2nd collecting electrode plate
24a Projection
25 Sheath resin
25a Projection

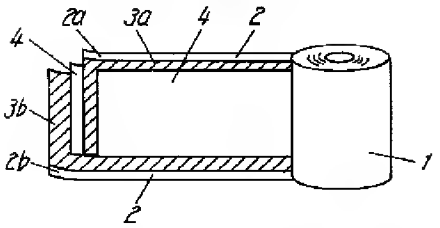
DRAWINGS

[Drawing 1]



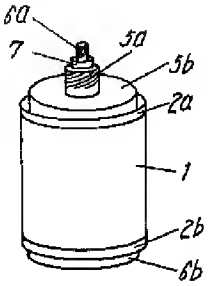
[Drawing 2]

1 巻回部材　　3a,3b 分極性電極層
2 一対の電極　　4 セパレータ
2a,2b 集電体の露出部分



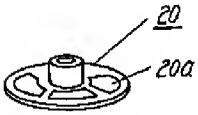
[Drawing 3]

1 巻回部材
2a,2b 集電体の露出部分
5a,6a 端子部
5b,6b 平面部
7 絶縁部材



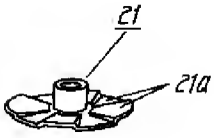
[Drawing 6]

20 集電板
20a 欠落部分

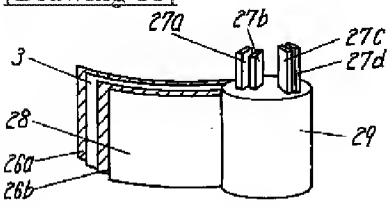


[Drawing 7]

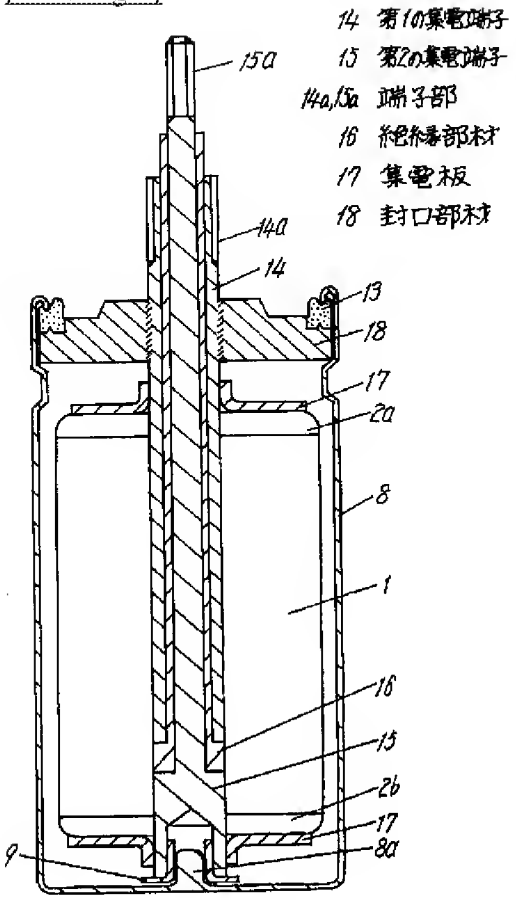
21 集電板
21a 凹凸部分



[Drawing 11]

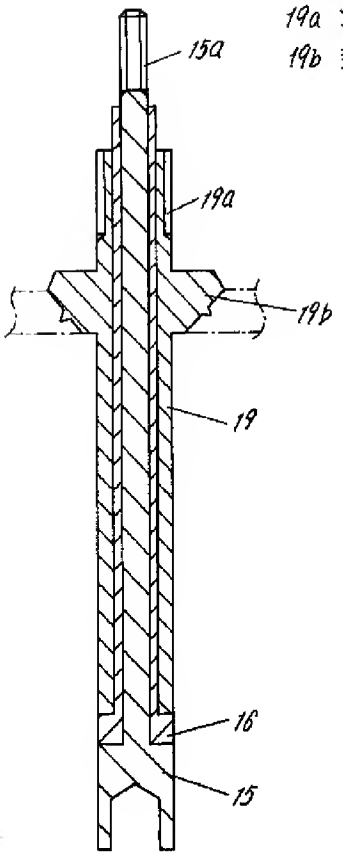


[Drawing 4]

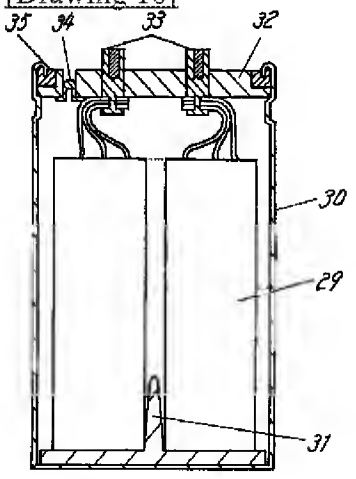


[Drawing 5]

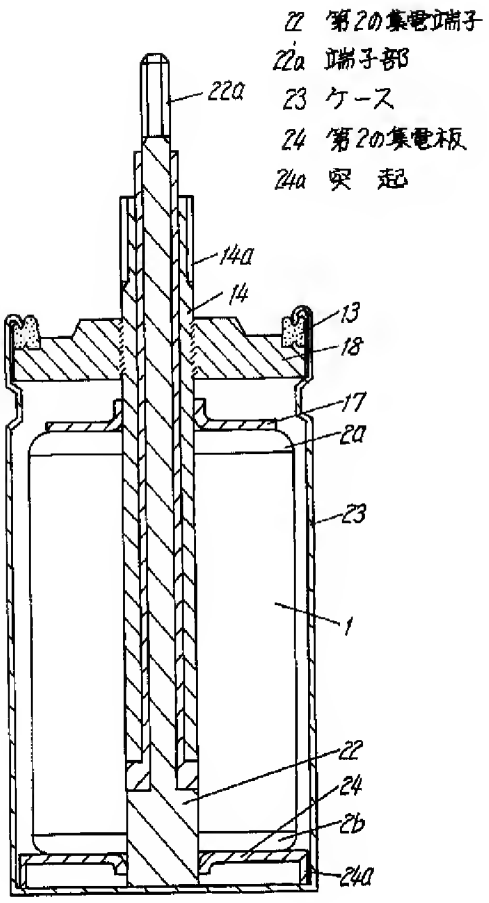
19 第1の集電端子
19a 端子部
19b 封口部材の一部



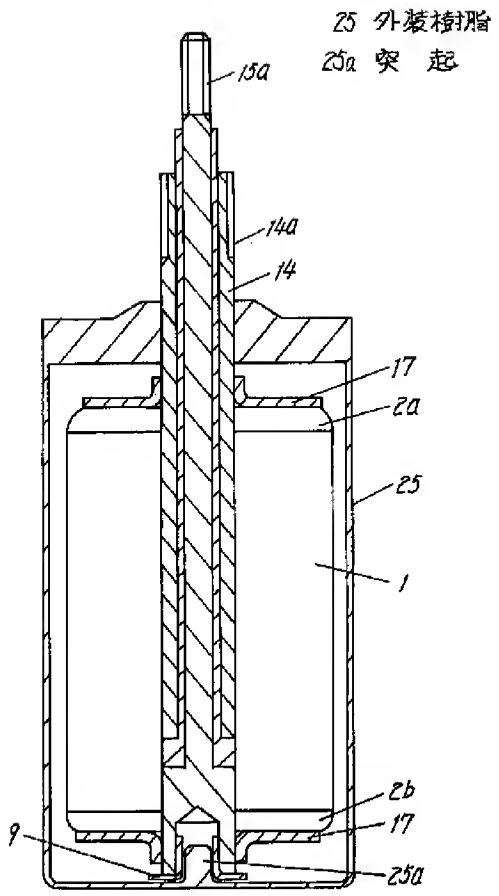
[Drawing 10]



[Drawing 8]


22 第2の集電端子
22a 端子部
23 ケース
24 第2の集電板
24a 突起
22a
14a
14
13
18
17
2a
23
1
22
24
2b
24a

[Drawing 9]


25 外装樹脂
25a 突 起
15a
14a
14
17
2a
25
1
2b
17
9
25a